

B. Amendment to the Claims

Please add new claims 67-85 as follows. A listing of all the claims in this application is provided.

1. ~~(Previously Amended/Withdrawn) A method of purifying polluted soil which contains a pollutant, comprising the steps of: heating the polluted soil to make the soil emit the pollutant and bringing the emitted pollutant into contact with functional water containing chlorine under light irradiation to decompose the pollutant.~~

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2. (Previously Amended) A method of purifying polluted soil which contains a pollutant, comprising the steps of:  
heating the polluted soil to make the soil emit a gas containing the pollutant;  
passing a gas through functional water to generate a gas containing chlorine;  
mixing the pollutant-containing gas and the chlorine-containing gas to form a gaseous mixture; and  
irradiating the gaseous mixture with light to decompose the pollutant.

3. (Original) The method of purifying polluted soil according to claim 1 or 2, wherein the heating is conducted using a heater.

4. (Original) The method of purifying polluted soil according to claim 1 or 2, wherein the heating is conducted by mixing the polluted soil with an inorganic compound which reacts exothermically with water.

5. (Original) The method of purifying polluted soil according to claim 4, wherein rolling processing is conducted after mixing the polluted soil with the inorganic compound.

6. (Original) The method of purifying polluted soil according to claim 4, wherein stirring processing is conducted after mixing the polluted soil with the inorganic compound.

7. (Original) The method of purifying polluted soil according to claim 4, wherein the inorganic compound is at least one selected from the group consisting of quick lime, magnesium oxide, barium oxide, strontium oxide, sodium oxide, potassium oxide, and anhydrides of calcium sulfate and magnesium sulfate, respectively.

8. (Original) The method of purifying polluted soil according to claim 4, wherein the water content of the polluted soil is 10 to 30% by weight.

9. (Original) The method of purifying polluted soil according to claim 1 or 2, wherein the functional water is water produced by electrolysis of water containing an electrolyte.

10. (Original) The method of purifying polluted soil according to claim 9, wherein the functional water is acid functional water produced in the vicinity of an anode by the electrolysis of the water containing an electrolyte.

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11. (Original) The method of purifying polluted soil according to claim 9, wherein the electrolyte is at least one selected from the group consisting of sodium chloride and potassium chloride.

12. (Original) The method of purifying polluted soil according to claim 1 or 2, wherein the functional water is an aqueous solution containing hypochlorous acid.

13. (Original) The method of purifying polluted soil according to claim 12, wherein the functional water containing hypochlorous acid is a hypochlorite aqueous solution.

14. (Original) The method of purifying polluted soil according to claim 13, wherein the hypochlorite is at least one selected from the group consisting of sodium hypochlorite and potassium hypochlorite.

15. (Original) The method of purifying polluted soil according to claim 12, wherein the functional water further contains an inorganic acid or an organic acid.

16. (Original) The method of purifying polluted soil according to claim 15, wherein the inorganic acid or the organic acid is at least one selected from the group consisting of hydrochloric acid, hydrofluoric acid, oxalic acid, sulfuric acid, phosphoric acid, boric acid, acetic acid, formic acid, malic acid and citric acid.

17. (Previously Amended) The method of purifying polluted soil according to claim 1 or 2, wherein the functional water has a pH of 1 to 4, an oxidation-reduction potential of 800 to 1500 mV, and a chlorine concentration of 5 to 150 mg/l.

18. (Previously Amended) The method of purifying polluted soil according to claim 1 or 2, wherein the functional water has a pH of 4 to 10, an oxidation-reduction potential of 300 to 1100 mV, and a chlorine concentration of 2 to 100 mg/l.

19. (Original) The method of purifying polluted soil according to claim 1 or 2, wherein the light comprises a light whose wavelength is in the range of 300 to 500 nm.

20. (Original) The method of purifying polluted soil according to claim 1 or 2, wherein the pollutant is a halogenated aliphatic hydrocarbon.

21. (Original) The method of purifying polluted soil according to claim 20, wherein the halogenated aliphatic hydrocarbon is an aliphatic hydrocarbon compound having at least one selected from the group consisting of chlorine substituent and fluorine substituent.

22. (Original) The method of purifying polluted soil according to claim 21, wherein the halogenated aliphatic hydrocarbon is at least one selected from the group consisting of trichloroethylene, 1,1,1-trichloroethane, tetrachloroethylene, cis-1,2-dichloroethylene, chloroform and dichloromethane.

23. (Original) The method of purifying polluted soil according to claim 1 or 2, further comprising the step of allowing an adsorption material to adsorb the pollutant.

24. (Original) The method of purifying polluted soil according to claim 2, wherein the chlorine concentration of the gaseous mixture is in the range of 5 ppm to 1000 ppm.

25. (Original) The method of purifying polluted soil according to claim 24, wherein the chlorine concentration of the gaseous mixture is in the range of 20 ppm to 500 ppm.

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26. (Original) The method of purifying polluted soil according to claim 2, wherein the gas passed through the functional water is the gas containing the pollutant extracted from the polluted soil.

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27. (Previously Amended/Withdrawn) ~~An apparatus for purifying polluted soil which contains a pollutant, comprising a means for heating the polluted soil to make the soil emit the pollutant, a means for bringing the emitted pollutant into contact with functional water including a chlorine-containing gas generating means, and a means for irradiating the functional water with light.~~

28. (Original) An apparatus for purifying polluted soil which contains a pollutant, comprising:

a gas-emitting means for heating the polluted soil to make the soil emit a gas containing the pollutant;

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a chlorine-containing gas generating means for generating a gas containing chlorine by passing a gas through functional water;

a mixing means for mixing the pollutant-containing gas and the chlorine-containing gas so as to form a gaseous mixture; and

a light irradiation means for irradiating the gaseous mixture with light.

29. (Original) The apparatus for purifying polluted soil according to claim 27 or 28, wherein the heating is conducted using a heater.

30. (Original) The apparatus for purifying polluted soil according to claim 27 or 28, wherein the heating is conducted by mixing the polluted soil with an inorganic compound which reacts exothermically with water.

31. (Original) The apparatus for purifying polluted soil according to claim 27 or 28, wherein the functional water is water produced by electrolysis of water containing an electrolyte.

32. (Original) The apparatus for purifying polluted soil according to claim 27 or 28, wherein the functional water is an aqueous solution containing hypochlorous acid.

33. (Previously Amended) The apparatus for purifying polluted soil according to claim 27 or 28, wherein the functional water has a pH of 1 to 4, an oxidation-reduction potential of 800 to 1500 mV, and a chlorine concentration of 5 to 150 mg/l.

34. (Previously Amended) The apparatus for purifying polluted soil according to claim 27 or 28, wherein the functional water has a pH of 4 to 10, an oxidation-reduction potential of 300 to 1100 mV, and a chlorine concentration of 2 to 100 mg/l.

35. (Previously Amended) The apparatus for purifying polluted soil according to claim 27 or 28, wherein the light irradiated by the light irradiation means comprises a light whose wavelength is in the range of 300 to 500 nm.

36. (Original) The apparatus for purifying polluted soil according to claim 28, wherein the means for heating the polluted soil is a rotary kiln.

37. (Original) The apparatus for purifying polluted soil according to claim 28, wherein the chlorine concentration of the gaseous mixture is in the range of 5 ppm to 1000 ppm.

38. (Original) The apparatus for purifying polluted soil according to claim 37, wherein the chlorine concentration of the gaseous mixture is in the range of 20 ppm to 500 ppm.

39. (Original) The apparatus for purifying polluted soil according to claim 28, wherein the gas which is passed through the functional water is the gas containing the pollutant extracted from the polluted soil.

40-55. (Cancelled)



56. (Original) The method of purifying polluted soil according to claim 5, wherein the inorganic compound is at least one selected from the group consisting of quick lime, magnesium oxide, barium oxide, strontium oxide, sodium oxide, potassium oxide, and anhydrides of calcium sulfate and magnesium sulfate, respectively.

57. (Original) The method of purifying polluted soil according to claim 6, wherein the inorganic compound is at least one selected from the group consisting of quick lime, magnesium oxide, barium oxide, strontium oxide, sodium oxide, potassium oxide, and anhydrides of calcium sulfate and magnesium sulfate, respectively.

58. (Original) The method of purifying polluted soil according to claim 10, wherein the electrolyte is at least one selected from the group consisting of sodium chloride and potassium chloride.

59. (Original) The method of purifying polluted soil according to claim 13, wherein the functional water further contains an inorganic acid or an organic acid.

60. (Original) The method of purifying polluted soil according to claim 14, wherein the functional water further contains an inorganic acid or an organic acid.

61-62. (Cancelled)

63. (Previously Added) The method of purifying polluted soil according to claim 59, wherein the inorganic acid or the organic acid is at least one selected from the group consisting of hydrochloric acid, hydrofluoric acid, oxalic acid, sulfuric acid, phosphoric acid, boric acid, acetic acid, formic acid, malic acid and citric acid.

64. (Previously Added) The method of purifying polluted soil according to claim 60, wherein the inorganic acid or the organic acid is at least one selected from the group consisting of hydrochloric acid, hydrofluoric acid, oxalic acid, sulfuric acid, phosphoric acid, boric acid, acetic acid, formic acid, malic acid and citric acid.

65. (Previously Added) A method for purifying polluted soil which contains a pollutant, comprising the steps of:

mixing a gas containing a pollutant emitted by heating polluted soil and a chlorine-containing gas to form a gaseous mixture; and

irradiating the gaseous mixture with light to decompose the pollutant.

66. (Previously Added/Withdrawn) An apparatus for purifying polluted soil which contains a pollutant, comprising:

a mixer that mixes a gas containing a pollutant emitted by heating polluted soil and a chlorine-containing gas to form a gaseous mixture; and

a light irradiator that irradiates the gaseous mixture with light to decompose the pollutant.

67. (New) A method of purifying polluted soil which contains a pollutant, comprising the steps of:

heating the polluted soil to make the soil emit a gas containing the pollutant;  
obtaining a mixture of the gas containing the pollutant and chlorine; and  
irradiating the mixture with light to decompose the pollutant.

68. (New) The method according to claim 67, wherein the heating is conducted using a heater.

69. (New) The method according to claim 67, wherein the heating is conducted by mixing the polluted soil with an inorganic compound which reacts exothermically with water.

70. (New) The method according to claim 69, wherein rolling processing is conducted after mixing the polluted soil with the inorganic compound.

71. (New) The method according to claim 69, wherein stirring processing is conducted after mixing the polluted soil with the inorganic compound.

72. (New) The method according to claim 69, wherein the inorganic compound is at least one selected from the group consisting of quick lime, magnesium

oxide, barium oxide, strontium oxide, sodium oxide, potassium oxide, and anhydrides of calcium sulfate and magnesium sulfate, respectively.

8. 73. (Original) The method according to claim 69, wherein the water content of the polluted soil is 10 to 30% by weight.

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74. (New) The method according to claim 67, wherein the light comprises wavelengths from 300 to 500 nm.

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75. (New) The method according to claim 67, wherein the pollutant is a halogenated aliphatic hydrocarbon.

76. (New) The method according to claim 75, wherein the halogenated aliphatic hydrocarbon is an aliphatic hydrocarbon compound having at least one selected from the group consisting of chlorine substituent and fluorine substituent.

76. (New) The method according to claim 75, wherein the halogenated aliphatic hydrocarbon is at least one selected from the group consisting of trichloroethylene, 1,1,1-trichloroethane, tetrachloroethylene, cis-1,2-dichloroethylene, chloroform and dichloromethane.

77. (New) The method according to claim 67, further comprising the step of allowing an adsorption material to adsorb the pollutant.

78. (New) The method according to claim 67, wherein chlorine concentration in the mixture is from 5 ppm to 1000 ppm.

79. (New) The method according to claim 78, wherein the chlorine concentration is from 20 ppm to 500 ppm.

80. (New) The method according to claim 70, wherein the inorganic compound is at least one selected from the group consisting of quick lime, magnesium oxide, barium oxide, strontium oxide, sodium oxide, potassium oxide, and anhydrides of calcium sulfate and magnesium sulfate, respectively.

81. (New) The method according to claim 71, wherein the inorganic compound is at least one selected from the group consisting of quick lime, magnesium oxide, barium oxide, strontium oxide, sodium oxide, potassium oxide, and anhydrides of calcium sulfate and magnesium sulfate, respectively.

82. (New) An apparatus for purifying polluted soil which contains a pollutant, comprising:

a heater to heat the polluted soil to make the soil emit the pollutant;

a mixing means having a space to mix the gas containing the pollutant and chlorine; and

a light irradiating means to irradiate the mixture with light to decompose the pollutant.

83. (New) The apparatus according to claim 82, wherein the heating is conducted by mixing the polluted soil with an inorganic compound which reacts exothermically with water.

84. (New) The apparatus according to claim 82, wherein the light irradiated by the light irradiation means comprises wavelengths from 300 to 500 nm.

85. (Original) The apparatus according to claim 82, wherein the heater comprises a rotary kiln.

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